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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/694,839	10/29/2003	Yasushi Hattori	Q78107	2503

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EXAMINER	
RICKMAN, HOLLY C	

ART UNIT	PAPER NUMBER
1773	

DATE MAILED: 02/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/694,839	HATTORI ET AL.	
	Examiner	Art Unit	
	Holly Rickman	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 December 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10 and 12-17* is/are rejected.

7)☒ Claim(s) *11 and 12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. The objection to claim 5 is withdrawn in view of Applicant's amendment.

2. Claim 12 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 12 requires a broader thickness range than set forth in claim 16 from which it depends.

Claim Rejections - 35 USC § 112

3. The rejection of claim 4 under 35 U.S.C. 112, second paragraph, is withdrawn in view of Applicant's amendments.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-10, 12, and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saitoh et al. (U56127039) in view of Murray et al. (U56254662).

Claim 1 requires a magnetic recording medium comprising a magnetic layer on at least one side of a nonmagnetic substrate, the magnetic layer containing magnetic particles of a CuAu type or Cu3Au type ferromagnetic ordered phases, wherein a conductive layer is provided on at least one side of the non-magnetic substrate.

It is noted that he examiner has interpreted "conductive," as used in the instant claims, to simply require a layer that is capable of transmitting electricity.

With the above interpretation in mind, Saitoh teaches a magnetic recording medium comprising a non-magnetic base, having on at least one side a non-magnetic base coating (i.e. an underlayer), wherein a magnetic layer is formed on the non-magnetic base coating (column 2, lines 25-35). In addition, the magnetic recording medium may have a backcoat formed on the side of the substrate opposite the magnetic layer side (column 2, line 55). The non-magnetic base coating includes a resin, a nonmagnetic powder, and a conductive substance (column 9, lines 5-11). The conductive substance is preferably selected from carbon black, SnO2, and TiO2 (column 9, lines 60-63). In view of this disclosure, the examiner considers the non-magnetic base coating to be equivalent to applicants claimed conductive layer.

Saitoh teaches the use of Fe based magnetic alloy powders in the magnetic Iayer, including alloys of Fe with Pt (column 11, line 66-column 12, line 21). However, Saitoh doesn't teach a magnetic Iayer containing CuAu or Cu3Au type magnetic particles, as required by claim 1.

With respect to this deficiency, Murray teaches that a major drive goal in the art of magnetic recording media is increased recording density. In particulate-based media, increase in recording density is typically achieved by reducing the particle size of magnetic particles utilized

in the media. However, this approach is limited because of the onset of super-paramagnetic behavior when particles are reduced below a certain size (the specific size depends on the material properties of the magnetic particle) (column 1, lines 15-30). Murray teaches that one effort to mitigate this limitation involves the use of particles having very high magnetocrystalline anisotropy (and thus high coercivity) arising from the presence of ordered intermetallic phases within the particles (column 1, lines 30-39). Murray teaches that FePt binary alloy particles are excellent candidates for this effort (column 1, lines 40-50), and media using these particles exhibit narrower transitions and reduced read back noise (column 1, lines 55- 60). Later Murray describes a method for making monodisperse FePt particles having a CuAu crystal structure (column 2, lines 25-35). Further, Murray teaches depositing these particles on the surface of a substrate, which he notes is an economic route to thin film media (column 2, lines 25-40).

Therefore it would have been obvious to one of ordinary skill in the art to substitute the FePt CuAu type particles taught by Murray for the Fe based magnetic particles taught by Saitoh.

One would have been motivated to make this modification in view of the teachings of Murray, which states that magnetic recording media using FePt CuAu type magnetic layers exhibit narrower transitions and higher read output, and the fact that Saitoh explicitly teaches that Fe based alloy particles, including FePt particles, are suitable for use as the magnetic particles in the magnetic layer.

With respect to the newly added limitation directed to the use of an "inorganic" substrate, it is the Examiner's contention that Saitoh meets this limitation because it teaches the use of an organic material filled with an inorganic material (see col. 15, lines 27-30). The claims do not

exclude the presence of additional unrecited components in the substrate (i.e., organic components) because closed claim language is not used with respect to the substrate composition.

Claim 2 is met as set forth above.

Claim 3 requires the conductive layer to be on a side opposite to that of the magnetic layer. The examiner takes the position that the backcoat of Saitoh as modified by Murray meets this limitation. The backcoat is specifically taught to contain carbon black for the purpose of improving an antistatic effect (column 15, lines 40-53). Given that carbon black is know to be conductive and the fact that the backcoat serves as an antistatic film, the examiner considers the backcoat to be equivalent to applicants claimed conductive coating on the side of the substrate opposite that of the magnetic layer.

Claim 4 requires the conductive layer to be formed on an "edge" e substrate. In the absence of a clear definition in the specification, the examiner has interpreted "edge" to mean any terminating portion of the substrate. The examiner does not interpret "edge"' as requiring "only" the end surface to be coated. Given this interpretation, claim 4 is met as set forth above for claims 1 or 3, as the conductive underlayer/backcoat are both disposed on the entire front and back surface of the media. Thus, they are on "edge" in the sense that they are formed on a terminating surface of the media. Furthermore, the conductive underlayer and backcoat are formed on the entire front and back surfaces of the media, so they must necessarily at some point be in contact with an "edge" of the media.

Claim 5 is met as set forth above for claim 1.

Claim 6 requires specific conductive particles. Saitoh teaches that the conductive particles can be ZnO, MgO, SnO2, titanium oxide, carbon black, corundum (equivalent to

Al2O3) and other materials (column 9, lines 10-20). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to select ZnO, MgO, SnO2, titanium oxide, or corundum as the material for the conductive particles in Saitoh, as Saitoh recognizes the equivalence of these materials.

Claim 7 is met as set forth above for claim 6. Though Saitoh does not explicitly teach the volume resistivity of the conductive particles in the conductive layer, the conductive particles used in Saitoh are listed in the instant specification as possessing the required volume resistivity. Thus, the examiner takes the position that this limitation is met.

Claim 8 requires the conductive layer to contain carbon black. Saitoh teaches that the conductive particles in the conductive layer can be carbon black (column 9, lines 11-20). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize carbon black as the conductive particles in Saitoh, as Saitoh recognizes the equivalence of Carbon black to the other materials listed as suitable.

Claims 9 and 10 requires the carbon black to have specific SBET and DBP properties. Saitoh teaches that the conductive particles (which can be carbon black) should have a specific surface area (BET method; considered to be equivalent to claimed SBET method), of 25-150 m2/g, and a DBP oil absorption of preferably 30-80 ml/g (column 9, lines 35-45).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize carbon black with a specific surface area (BET method) of 25-150 m2/g, and a DBP oil absorption of preferably 30-80 ml/g as the conductive particles in Saitoh, as Saitoh recognizes the equivalence of Carbon black to the other materials listed as

suitable, and specifically teaches that the conductive particles should have these BET and DBO characteristics.

Claims 16, 17 and 12 require the conductive layer to be 10-400nm, 20-400 nm and 10-700nm thick, respectively. Saitoh teaches that the nonmagnetic base layer is "generally a thickness of 0.5-3 μm" and the specific thickness is determined based on the roughness of the surface to be coated (column 16, lines 50-55).

Therefore it would have been obvious to one of ordinary skill in the art to form the non-magnetic base coating of Saitoh to thickness of approximately 0.5 micron (500 nm). It is the Examiner's contention that there does not appear to be any distinction in the properties of the article the numbers are so close, they appear to overlap. In any event these values would be minor obvious variations and expected to have the same properties. *See Titanium Metals Corporation vs Banner,* 778 F. d. 775, 227 USPQ 773 (Fed. Cir. 1985).

Claim 14 is met as set forth above for claim 1.

Claim 15 requires a protection film on the magnetic layer. Saitoh teaches forming a lubricant layer of a DLC (diamond like carbon) film over the magnetic layer (column 16, lines 30-35). These layers are specifically taught to function as protective layers.

6. The rejection of claims 3-4 and 11under 35 U.S.C. 103(a) as being unpatentable over Yanai et al. (JP04005212) in view of Murray et al. is withdrawn in view of Applicant's arguments.

7. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yanai et al. (JP 05-189746 – application number JP04005212 – see attached translation) in view of Murray et al.

Yanai teaches a magnetic recording medium comprising a substrate formed from a material such as aluminum, glass, etc. (see paragraph 15 of the translation), a magnetic layer comprising magnetic particles on one side of the substrate, and a conductive polymer compound on the other side of the substrate (see abstract).

Yanai doesn't teach a recording medium utilizing CuAu or Cu3Au particles, as required by claim 1 .

Murray teaches that a major drive goal in the art of magnetic recording media is increased recording density. In particulate-based media, increase in recording density is typically achieved by reducing the particle size of magnetic particles utilized in the media. However, this approach is limited because of the onset of super-paramagnetic behavior when particles are reduced below a certain size (the specific size depends on the material properties of the magnetic particle) (column 1, lines 15- 30). Murray teaches that one effort to mitigate this limitation involves the use of particles having very high magnetocrystalline anisotropy (and thus high coercivity) arising from the presence of ordered intermetallic phases within the particles (column 1, lines 30-39). Murray teaches that FePt binary alloy particles are excellent candidates for this effort (column 1, lines 40-50), and media using these particles exhibit narrower transitions and reduced read back noise (column 1, lines 55-60). Later Murray describes a method for making monodisperse FePt padicles having a CuAu crystal structure (column 2, lines 25-35). Further, Murray teaches depositing these particles on the surface of a substrate, which he notes is an economic route to thin film media (column 2, lines 25-40).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the particle taught by Murray as the magnetic particles in the Yanai. 35. One would have been motivated to make this modification in view of the fact that Murray teaches that media utilizing these particles exhibit narrower transitions and lower read back noise, and are economical.

8. Claim 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Saitoh as modified by Murray above, and further in view of Ushigome (U55523153).

Saitoh as modified by Murray above fails to teach the surface electric resistance of required by claim 13. However, it is noted that in addition to magnetic particles, Saitoh teaches that the magnetic layer can also contain carbon black (column 14, lines 45-48).

Furthermore, Ushigome teaches that it is known in the art of magnetic recording media that the reliability of the media is negatively impacted by dust adhering to the surface of the media. When the magnetic layer has a high surface electric resistance, the magnetic layer is easily charged and dust readily adheres to its surface. To increase the reliability of the media, the surface electric resistance of the media should be smaller than $5x10^7$ Ohm/cm (column 1, lines 20-35). This can be accomplished by controlling the amount of carbon black in the magnetic layer (column 1, lines 20-35).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to control the amount of carbon black in the magnetic layer of Saitoh as modified by Murray so as to obtain a surface electric resistance of less than $5x10^7$ Ohm/cm. One would have been motivated to make this modification in view of the teaching in Ushigome that

the reliability of the media is improved by controlling the surface electric resistance to a value below 5 x 10^7 Ohm/cm.

Allowable Subject Matter

9. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

10. Applicant's arguments filed 12/9/04 have been fully considered but they are not persuasive.

Applicant argues that the "temperature limit" of the organic substrates taught by Saitoh, Yanai and Ushigome is about 400 °C. For this reason, Applicant maintains that these references are not properly combined with the reference to Murray which requires annealing of the magnetic layer taught therein at a temperature of 500°C in order to produce an ordered crystalline structure. It is not clear to the Examiner how Applicant arrived at a "temperature limit" of 400°C for the organic layers taught by the prior art. In particular, it is noted that Saitoh teaches the use of an inorganic particulate filled organic layer and would thus, be expected to have a different properties that a purely organic layer. There is no evidence of record at the present time to support Applicant's claim that the organic materials taught by the prior art would not be capable of withstanding the annealing process required by Murray et al. Thus, Applicant's argument is not persuasive.

With respect to the newly added thickness recitations, it is the Examiner's contention that the prior art meets these limitations for the reasons detailed in the rejections, above.

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Holly Rickman whose telephone number is (571) 272-1514. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Holly Rickman
Primary Examiner
Art Unit 1773

February 21, 2005